MCELLBI 130 Cell & Systems Biology

Text: There is no required textbook for this class. Your most useful resource will be the information uploaded by your instructors on the bCourses website.

However, the textbook "Molecular Biology of the Cell" by Alberts et al. is a useful reference. Equally suitable books are "Molecular Cell Biology" by Lodish et al. and "Cell Biology" by Pollard and Earnshaw. For the systems biology portion, a useful reference is "An Introduction to Systems Biology: Design Principles of Biological Circuits" by Alon.

Please note that the emphasis in this course is on the material covered in lecture and in the lecture notes.

Any of the major cell biology textbooks is useful for several courses and can be used for a reference for many years. A biochemistry course such as MCB 102 or MCB 100 as well as MCB104 is required background.

Lecture Notes:

Lecture notes are available on bCourses.

Office Hours:

Professor office hours will only be during weeks that they teach, and there will be no office hours the first week of class.

An important element in doing well in this class is keeping up to date. Reviewing the uploaded lecture notes before the next lecture and looking at the assigned reading the same day as the lecture has proven to make an enormous difference in the final result. Do not hesitate to ask the instructors questions. **Each lecture in turn uses the material from previous lectures.** Because we assume you have mastered the previous material, it is easy to get left behind if you do not master the material presented to you as we go along.

Please ask questions in section and office hours. We will be happy to answer them. The best time to ask them is after reviewing your notes – we highly recommend reviewing your lecture notes soon after each lecture. **Email is best for administrative purposes, not for questions on course content.**

Letters of recommendation:

Any of the three instructors may be approached for a letter of recommendation. We all are quite willing to provide a written evaluation for this purpose. So that we may prepare effective evaluations we ask that you follow the procedure outlined here. Be sure to attend at least 2 of the instructor's office hours. In addition, ask your discussion section

GSI to write a brief note about your participation in section to the instructor. Sometime after the end of the course, request an interview with the instructor and bring a copy of your complete transcript, your CV and Personal Statement along with any recommendation forms that need to be filled in.

COURSE MECHANICS

Grading: 300 points total.

In **Discussion Section**, there will be 2 problem sets and one quiz **for each third (section) of the course**:

2 problem sets + participation	=	10 pts	
1 quiz	=	10 pts	
Total	=	20 pts	x 3 sections = **60** points.

The timing of these quizzes is entirely at the discretion of your GSI. There are no make-ups or re-grades for these quizzes.

Midterms:

50 points each (150 total). The three midterms are on announced firm dates. These are given in the regular class period. **Makeup Midterm tests** will only be given at the discretion of the instructor and for extraordinary documented reasons that require advance notice **before the original scheduled time of the test (with the exception of medical emergencies)**. Professional or Medical school interviews should not be arranged for midterm dates since makeup exams will not be granted for this reason.

Final:

75 points. The final includes material from all sections of the course.

Lecture participation:

5 points each Professor (15 total). Participation in lecture can be achieved through spoken questions/comments, questions in the chat, or questions after class.

Accommodations for Students with Disabilities:

The purpose of academic accommodations is to ensure that all students have a fair chance at academic success. If you have Letters of Accommodations from the Disabled Students' Program or another authorized office, please share them with me as soon as possible, and we will work out the necessary arrangements. While individual circumstances can vary, requests for accommodations often fall into the categories listed

on the Academic Calendar and Accommodations website (https://teaching.berkeley.edu/academic-calendar-and-student-accommodations-campus-policies-and-guidelines). The campus has well-developed processes in place for students to request accommodations, and you are encouraged to contact the relevant campus offices listed on the Academic Accomodations Hub (https://evcp.berkeley.edu/programs-resources/academic-accommodations-hub). These offices, some of which are confidential, can offer support, answer questions about your eligibility and rights, and request accommodations on your behalf, while maintaining your privacy.

Please inform us of any accommodations needed during the first two weeks of the course so that we can work out the necessary arrangements.

Re-grading:

Any regrades will be comprehensive for the full exam, rarely result in an increased score, and may result in a lower overall score.

Academic Integrity and Cheating:

You are a member of an academic community at one of the world's leading research universities. You should keep in mind that as a member of the campus community, you are expected to demonstrate integrity in all of your academic endeavors and will be evaluated on your own merits. **The consequences of cheating and academic dishonesty—including a formal discipline file, possible loss of future internship, scholarship, or employment opportunities, and denial of admission to graduate school—are simply not worth it and may exceed student expectations.** For example, please be aware that, in addition to other consequences, any cheating found will result in loss of ability of the student to graduate with honors.

We know that most students are honest and do not cheat and our policy is designed to protect these students. **Thus, cheating of any type will not be tolerated**. UC Berkeley's cheating policy (http://bulletin.berkeley.edu/academic-policies/#studentconductappealstext) will be followed**.** Please note that although remote exams make it easier to cheat, they also make detection and documentation of cheating much easier. **If exams will have to be administered virtually, this will include safeguards to prevent cheating and measures to detect it.** Quizzes and midterms must be completed individually. Evidence that students have communicated information about these exams during or afterwards by any means will result in zeros for all parties involved and reporting to the Office of Student Conduct. If any other type of cheating is found, the student will automatically be assigned a zero for that test and the Office of Student Conduct will be notified. Our department has been proactive about detection of cheating and implementation of anti-cheating policies. As a result, hundreds of students have been referred to the Office of Student Conduct by MCB since the pandemic started.

Incompletes:

These requests are rarely granted and only for exceptional cases of prolonged illness or truly exceptional documented family emergencies, which extend over long periods of time. If an incomplete has been granted you can obtain an "I" Grade Report Form and instructions on their use MCB UG advising office.

Statement on Classroom Climate:
We are all responsible for creating a learning environment that is welcoming, inclusive, equitable, and respectful. The expectation in this class is that we all live up to this responsibility, even during vigorous debate or disagreement, and that we will intervene if exclusionary or harassing behavior occurs. If you feel that these expectations are not being met, you can consult your instructors or seek assistance from campus resources.

The classroom, lab, and workplace should be safe and inclusive environments for everyone. The Office for the Prevention of Harassment and Discrimination (OPHD) is responsible for ensuring the University provides an environment for faculty, staff and students that is free from discrimination and harassment on the basis of categories including race, color, national origin, age, sex, gender, gender identity, and sexual orientation. Questions or concerns? Call (510) 643-7985, email ask_ophd@berkeley.edu, or go to http://survivorsupport.berkeley.edu/Links to an external site.Links to an external site.

Lecture Schedule

1. Jan 19 (W)	GB1	Intro to Cell and Systems Biology
2. Jan 21 (F)	MR1	Principles of cell cycle control
3. Jan 24 (M)	MR2	Entry into mitosis
4. Jan 26 (W)	MR3	Mitotic exit
5. Jan 28 (F)	MR4	Biochemical oscillators
6. Jan 31 (M)	MR5	Cell cycle checkpoints
7. Feb 2 (W)	MR6	Cell cycle arrest in checkpoint signaling
8. Feb 4 (F)	MR7	Spatial control of cell division
9. Feb 7 (M)	MR8	Review
10. Feb 9 (W)	MR9	Spatial control II
11. Feb 11 (F)	MR10	Quantitative signaling
Feb 14 (M)	MR11	Morphogen signaling
12. Feb 16 (W)	MR12	Transcription-dependent cell fate
Feb 18 (F)	MR13	Autoregulatory feedback loops to define cell states
13. Feb 21 (M)	Holiday	
14. Feb 23 (W)	Midterm 1	
15. Feb 25 (F)	GB2	Components of a cell
16. Feb 28 (M)	GB3	Systems cell biology: Significance of cell-to-cell

variability

17. Mar 2 (W)	GB4	Synthesis and degradation in information flow
18. Mar 4 (F)	GB5	High-throughput sequencing
19. Mar 7 (M)	GB6	Measuring information flux and physical interactions
20. Mar 9 (W)	GB7	Measuring information flux and physical interactions (II)
21. Mar 11 (F)	GB8	Receptor-ligand interactions and signaling
22. Mar 13 (M)	GB9	Receptor-ligand interactions and signaling (II)
23. Mar 16 (W)	GB10	Properties of Membranes
24. Mar 18 (F)	GB11	Cellular sorting I: the nuclear pore
Mar 21 (M)	Spring Break	
Mar 23 (W)	Spring Break	
Mar 25 (F)	Spring Break	
25. March 28 (M)	GB12	Cellular sorting II: the secretory pathway /Review
March 30 (W)	Midterm 2	
26. Apr 1 (F)	JO1	Lipids and membranes: Lipid properties (part I)
27. Apr 4 (M)	JO2	Lipids and membranes: Shaping organelles (part II)
28. Apr 6 (W)	JO3	Organizing lipids: Contact sites and lipid transfer
29. Apr 8 (F)	JO4	Lipid droplets: Dynamic lipid storage depots I
30. Apr 11 (M)	JO5	Lipid droplets: Dynamic lipid storage depots II
31. Apr 13 (W)	JO6	Monitoring and sensing lipids (part I)
32. Apr 15 (F)	JO7	Monitoring and sensing lipids (part II)
33. Apr 18 (M)	JO8	Apoptosis (part I)
34. Apr 20 (W)	JO9	Non-apoptotic cell death: Apoptosis (part II)
35. Apr 22 (F)	JO10	Non-apoptotic cell death: Ferroptosis (part I)
36. Apr 25 (M)	JO11	Non-apoptotic cell death: Ferroptosis (part II)
37. April 27 (W)	JO12	Non-apoptotic cell death: Pyrop/Necroptosis
April 29 (F)	Midterm 3	

May 2-6
May 10 (T)
RRR week
Final Exam 7-10pm